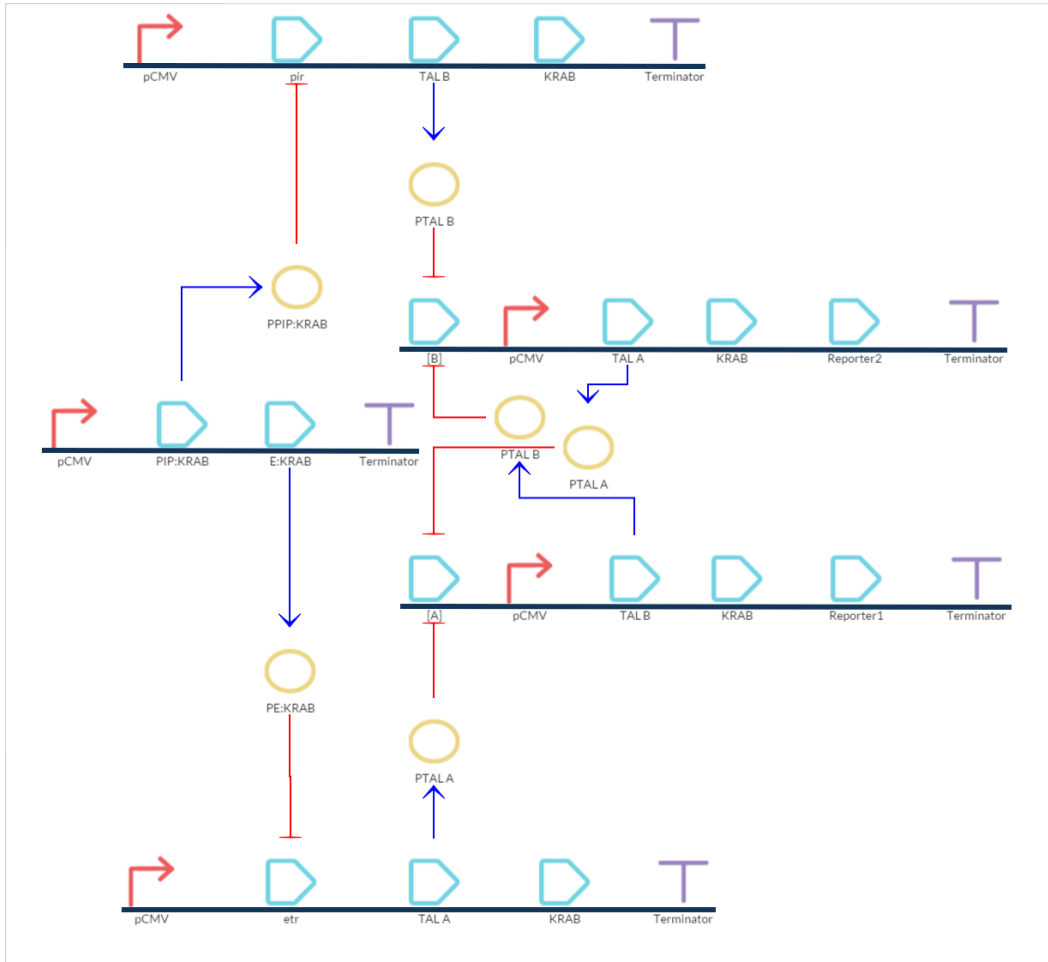


Repressor switch



$$[PTALA] = [PTALA_1] + [PTALA_2]$$

$$[PTALB] = [PTALB_1] + [PTALB_2]$$

Construct1

Assume

$$\alpha_1 = \frac{1}{1 + \left(\frac{[PTALA]}{\beta_{PTALA}} \right)^{\mu_{PTALA}}}$$

$$[TALB_1^F] = \alpha_1 [TALB_1]$$

$$\frac{d[PTALB_1]}{dt} = \chi_{pCMV_1} [TALB_1^F] - \text{deg}[PTALB_1]$$

Construct2

Assume

$$\alpha_3 = \frac{1}{1 + \left(\frac{[\text{PTALB}]}{\beta_{\text{PTALB}}} \right)^{\mu_{\text{PTALB}}}}$$

$$[\text{TALA}_1^F] = \alpha_3 [\text{TALA}_1]$$

$$\frac{d[\text{PTALA}_1]}{dt} = \chi_{p\text{CMV}_2} [\text{TALA}_1^F] - \deg[\text{PTALA}_1]$$

Construct3

PTALB2

$$\frac{d[\text{PTALB}_2]}{dt} = \chi_{p\text{CMV}_3} (k_{1\text{BKR}} + k_{3\text{BKR}} f_3) [\text{TALB}_2] - \deg[\text{PTALB}_2]$$

$$f_3 = \frac{K_r}{K_r + k_3 [\text{pir}^F]^{n_3}}$$

Assume

$$\alpha_5 = \frac{1}{1 + \left(\frac{[\text{PPIP} : \text{KRAB}]}{\beta_{\text{PPIP}:\text{KRAB}}} \right)^{\mu_{\text{PPIP}:\text{KRAB}}}}$$

$$[\text{pir}^F] = \alpha_5 [\text{pir}]$$

Construct4

PTALA2

$$\frac{d[\text{PTALA}_2]}{dt} = \chi_{p\text{CMV}_4} (k_{2\text{AKR}} + k_{4\text{AKR}} f_4) [\text{TALA}_2] - \deg[\text{PTALA}_2]$$

$$f_4 = \frac{K_r}{K_r + k_4 [\text{etr}^F]^{n_4}}$$

Assume

$$\alpha_6 = \frac{1}{1 + \left(\frac{[\text{PE} : \text{KRAB}]}{\beta_{\text{PE}:\text{KRAB}}} \right)^{\mu_{\text{PE}:\text{KRAB}}}}$$

$$[\text{etr}^F] = \alpha_6 [\text{etr}]$$

Construct5

PPIP:KRAB1

$$\frac{d[\text{PPIP} : \text{KRAB}]}{dt} = \chi_{p\text{CMV}_5} k_{\text{PIP}} [\text{PIP} : \text{KRAB}] - \deg[\text{PPIP} : \text{KRAB}]$$

PE:KRAB1

$$\frac{d[\text{PE} : \text{KRAB}]}{dt} = \chi_{p\text{CMV}_5} k_E [\text{E} : \text{KRAB}] - \deg[\text{PE} : \text{KRAB}]$$

Parameter Table

Symbols	Parameters	Values and Units
beta_PTALA	Repression coefficient of PTALA	2.6
beta_PTALB	Repression coefficient of PTALB	3
beta_PPIP:KRAB	Repression coefficient of PPIP:KRAB	1.7
beta_PE:KRAB	Repression coefficient of PE:KRAB	2.6
mju_PTALA	Cooperativity coefficient of PTALA	2
mju_PTALB	Cooperativity coefficient of PTALB	2
mju_PPIP:KRAB	Cooperativity coefficient of PPIP:KRAB	2
mju_PE:KRAB	Cooperativity coefficient of PE:KRAB	2
deg	Protein degradation rate	0.93 s ⁻¹
k_1BKR	TAL-B:KRAB production rate from construct 1	1.12 umol*min ⁻¹
k_3BKR	TAL-B:KRAB production rate from construct 3	1.87 umol*min ⁻¹
k_2AKR	TAL-A:KRAB production rate from construct 2	1.39 umol*min ⁻¹
k_4AKR	TAL-B:KRAB production rate from construct 4	1.52 umol*min ⁻¹
K_r	Repression coefficient	3
k_3	Constant	0.80
k_4	Constant	0.83
k_PIP	PIP:KRAB production rate	2.35umol*min ⁻¹
k_E	E:KRAB production rate	2.04umol*min ⁻¹
n_3	pir Cooperativity coefficient	2
n_4	etr Cooperativity coefficient	2

Reference: <http://2012.igem.org/Team:Slovenia>